

A2T Q1 Quarter Test Review Key

$$1) \sqrt{96}$$

$$\sqrt{16} \sqrt{6}$$

$$\boxed{4\sqrt{6}}$$

$$2) 6\sqrt{54} - 3\sqrt{24} - 8\sqrt{96}$$

$$6\sqrt{9}\sqrt{6} - 3\sqrt{4}\sqrt{6} - 8\sqrt{16}\sqrt{6}$$

$$6 \cdot 3\sqrt{6} - 3 \cdot 2\sqrt{6} - 8 \cdot 4\sqrt{6}$$

$$18\sqrt{6} - 6\sqrt{6} - 32\sqrt{6}$$

$$-20\sqrt{6} \quad \boxed{B}$$

$$3) -\sqrt{6}(2\sqrt{6} - 4\sqrt{2})$$

$$-2\sqrt{36} + 4\sqrt{12}$$

$$-2(6) + 4\sqrt{4}\sqrt{3}$$

$$-12 + 4 \cdot 2\sqrt{3}$$

$$\boxed{-12 + 8\sqrt{3}}$$

$$4) \frac{\sqrt{10}-8}{4+\sqrt{10}} \cdot \frac{4-\sqrt{10}}{4-\sqrt{10}} = \frac{4\sqrt{10}-10-32+8\sqrt{10}}{16-10} = \frac{-42+12\sqrt{10}}{6}$$

$$\boxed{C} = \boxed{-7+2\sqrt{10}}$$

$$5) (-3x^2y^3)^3$$

$$(-3)^3 x^6 y^9$$

$$-27x^6y^9 \quad \boxed{B}$$

$$6) 3x^0$$

$$3(1)$$

$$\boxed{3}$$

$$7) (2b^{-3})^{-2}$$

$$2^{-2}b^6 = \frac{b^6}{2^2} = \boxed{\frac{b^6}{4}}$$

$$8) \left(\frac{9}{49}\right)^{-\frac{3}{2}} = \left(\frac{49}{9}\right)^{\frac{3}{2}} = \frac{49^{\frac{3}{2}}}{9^{\frac{3}{2}}} = \frac{(\sqrt{49})^3}{(\sqrt{9})^3} = \frac{7^3}{3^3} = \frac{343}{27} \quad \boxed{C}$$

$$9) \sqrt[3]{x^2y^4} = \boxed{x^{\frac{2}{3}} \cdot y^{\frac{4}{3}}}$$

$$10) \sqrt[4]{ab^3} = \boxed{a^{\frac{1}{4}} b^{\frac{3}{4}}}$$

$$11) 3\sqrt{-18} + 5\sqrt{-12}$$

$$3\sqrt{-9}\sqrt{2} + 5\sqrt{-4}\sqrt{3}$$

$$3 \cdot 3i\sqrt{2} + 5 \cdot 2i\sqrt{3}$$

$$9i\sqrt{2} + 10i\sqrt{3} \quad \boxed{D}$$

$$12) 2i^8 \quad i^8 = i^0 = 1$$

$$2(1) = 2 \quad \boxed{A}$$

Multiplicative
Inverse

$$13) -4+3i \quad \frac{1}{-4+3i} \cdot \frac{-4-3i}{-4-3i} = \frac{-4-3i}{16-9i^2} = \frac{-4-3i}{16+9} = \frac{-4-3i}{25} = \boxed{\frac{-4-3i}{25}}$$

$$14) (2+i)(3-6i) \\ 6-12i+3i-6i^2 \\ 6-9i-6(-1) \\ 6-9i+6 \\ \boxed{12-9i}$$

$$15) \frac{2+i}{3+i} \cdot \frac{3-i}{3-i} = \frac{6-2i+3i-i^2}{9-i^2} = \frac{6+i-(-1)}{9+1} = \frac{7+i}{10} \quad \boxed{D}$$

$$16) z = 6-3i \\ |z| = \sqrt{6^2+(-3)^2} \\ = \sqrt{36+9} \quad \boxed{D} \\ = \sqrt{45} = \sqrt{9 \cdot 5} = 3\sqrt{5}$$

$$17) (2+3i) + (-1-6i) = 1-3i \quad \text{Q IV} \quad \boxed{D}$$

$$18) 16^{3x} = 8^{x+1} \\ (2^4)^{3x} = (2^3)^{x+1} \\ 2^{12x} = 2^{3x+3} \\ \rightarrow \begin{array}{r} 12x = 3x+3 \\ -3x \quad -3x \\ \hline 9x = 3 \\ \frac{9x}{9} = \frac{3}{9} \quad \boxed{x = \frac{1}{3}} \end{array}$$

$$19) 4x^{1/5} + 2 = 10 \\ \underline{-2 \quad -2} \\ 4x^{1/5} = 8 \\ \frac{4x^{1/5}}{4} = \frac{8}{4} \\ x^{1/5} = 2 \\ x^{1/5} = 2^5 \\ \boxed{x = 32}$$

$$20) x^4 - 81y^4 \\ (x^2+9y^2)(x^2-9y^2) \\ (x^2+9y^2)(x-3y)(x+3y) \quad \boxed{A}$$

$$21) x^3+27 = (x+3)(x^2-3x+3^2) \\ \boxed{C} (x+3)(x^2-3x+9)$$

$$22) 27x^3 - 8 \\ \sqrt[3]{27x^3} = 3x \quad (3x-2)((3x)^2+(3x)(2)+2^2) \\ \sqrt[3]{8} = 2 \\ \boxed{(3x-2)(9x^2+6x+4)}$$

$$23) \begin{array}{l} ac - ad + 2bc - 2bd \\ a(c-d) + 2b(c-d) \end{array}$$

$$\boxed{(c-d)(a+2b)}$$

$$24) 3x^2 + 7x + 2$$

$$3x^2 + 6x + 1x + 2$$

$$3x(x+2) + 1(x+2)$$

$$\boxed{(x+2)(3x+1)}$$

$$ac = 6$$

$$\begin{array}{r} 1 \overline{) 6} \\ 2 \overline{) 3} \end{array}$$

$$25) 3a^2 - 2ab - 1b^2$$

$$3a^2 - 3ab + 1ab - b^2$$

$$3a(a-b) + b(a-b)$$

$$\boxed{(a-b)(3a+b)}$$

$$ac = -3$$

$$\begin{array}{r} 1 \overline{) -3} \\ -1 \overline{) 3} \end{array}$$

$$26) \sqrt{5-x} + 3 = x$$

$$\begin{array}{r} -3 \quad -3 \\ \hline (\sqrt{5-x})^2 = (x-3)^2 \end{array}$$

$$5-x = x^2 - 6x + 9$$

$$\begin{array}{r} -5+x \quad \quad \quad +x-5 \\ \hline \end{array}$$

$$0 = x^2 - 5x + 4$$

$$0 = (x-4)(x-1)$$

$$\boxed{x=4} \quad x=1 \text{ reject}$$

(A)

$$27) (\sqrt[3]{2x-5})^3 = (3)^3$$

$$2x-5 = 27$$

$$\begin{array}{r} +5 \quad +5 \\ \hline \end{array}$$

$$\frac{2x}{2} = \frac{32}{2}$$

$$\boxed{x=16}$$

$$29) \frac{4}{x^2-9} \quad x^2-9 \neq 0$$

$$(x+3)(x-3) \neq 0$$

$$x \neq -3 \quad x \neq 3$$

(A)

$$28) (\sqrt{y^2+2})^2 = (y-1)^2$$

$$\begin{array}{r} y^2+2 = y^2-2y+1 \\ -y^2-2 \quad -y^2 \quad -2 \end{array}$$

$$0 = -2y - 1$$

$$\begin{array}{r} +1 \quad \quad \quad +1 \\ \hline \end{array}$$

$$\frac{1}{-2} = \frac{-2y}{-2}$$

$$\boxed{y = -\frac{1}{2}}$$

reject

$$30) \frac{2x+3}{4} \quad \{ \emptyset \}$$

$$31) \frac{3z^2-12z}{4z^2-z^3} = \frac{3z(z-4)}{z^2(4-z)}$$

$$= \frac{-3}{z} \quad (B)$$

$$31) \frac{3z^2 - 12z}{4z^2 - z^3} = \frac{3z(z-4)}{z^2(4-z)} = \frac{-3}{z} \quad \boxed{B}$$

$$32) \frac{24s^2 - 2s - 1}{6s + 1} = \frac{24s^2 - 6s + 4s - 1}{6s + 1} = \frac{(4s-1)(6s+1)}{6s+1} = \boxed{4s-1}$$

$$\begin{array}{r|l} 24s^2 - 6s & +4s - 1 \\ 6s(4s-1) & +1(4s-1) \\ \hline & (4s-1)(6s+1) \end{array}$$

$$33) \frac{6}{b-1} \cdot \frac{5-5b}{10} = \frac{6}{b-1} \cdot \frac{5(1-b)}{10} = \frac{-3}{1} \quad \boxed{D}$$

$$34) \frac{18y^{12} - 9y^6 + 3y^3}{3y^3} = \frac{3y^3(6y^9 - 3y^3 + 1)}{3y^3} = 6y^9 - 3y^3 + 1 \quad \boxed{D}$$

$$35) \frac{x-4}{2x^2-7x+3} \div \frac{3x-12}{5x^2-45} = \frac{x-4}{(2x-1)(x-3)} \cdot \frac{5(x+3)(x-3)}{3(x-4)} = \frac{5(x+3)}{3(2x-1)}$$

$$36) \frac{3}{x-3} + \frac{x}{3-x} = \frac{3}{x-3} + \frac{x}{-1(x-3)} = \frac{3}{x-3} + \frac{-x}{x-3} = \frac{3-x}{x-3} = \frac{3-x}{x-3} \quad \begin{matrix} \textcircled{A} \\ \textcircled{-1} \end{matrix}$$

$$\textcircled{*} (2-z) = -1(z-2)$$

$$37) \frac{4}{z^2-4} + \frac{3}{2z-z^2} = \frac{4}{(z+2)(z-2)} + \frac{3}{-z(z-2)} = \frac{4}{(z+2)(z-2)} + \frac{-3}{z(z-2)}$$

$$\text{LCD: } z(z+2)(z-2)$$

$$\frac{4z}{z(z+2)(z-2)} + \frac{\overset{-3 \neq -6}{-3(z+2)}}{z(z+2)(z-2)} = \boxed{\frac{z-6}{z(z+2)(z-2)}}$$

$$\text{LCD: } (x+5)(x-1)(x+1)$$

$$38) \frac{4}{x^2+4x-5} - \frac{3}{x^2-1} = \frac{4(x+1)}{(x+5)(x-1)(x+1)} - \frac{3(x+5)}{(x+5)(x-1)(x+1)} = \boxed{\frac{x-11}{(x+5)(x-1)(x+1)}}$$

$$39) \frac{x^{-1}-1}{x-1} = \frac{\frac{1}{x} - \frac{1}{1}}{\frac{x-1}{1}} \quad \text{LCD: } x \quad \frac{\left(\frac{x}{1}\right)\frac{1}{x} - \frac{1}{1}\left(\frac{x}{1}\right)}{\frac{x-1}{1}\left(\frac{x}{1}\right)} = \frac{1-x}{x^2-x}$$

$$\text{LCD: } c^2$$

$$40) \left(\frac{1}{1}\right)\frac{1}{1} + \frac{1}{c}\left(\frac{c^2}{1}\right) - \frac{20}{c^2}\left(\frac{c^2}{1}\right) = \frac{c^2+c-20}{c^2+4c-5}$$

$$\left(\frac{c^2}{1}\right)\frac{1}{1} + \frac{4}{c}\left(\frac{c^3}{1}\right) - \frac{5}{c^2}\left(\frac{c^2}{1}\right) = \frac{c^2+c-20}{c^2+4c-5}$$

$$= \frac{(c+5)(c-4)}{(c+5)(c-1)} = \boxed{\frac{c-4}{c-1}}$$

$$\frac{1-x}{x(x-1)} = \frac{\overset{(B)}{-1}}{x}$$

$$\text{LCD: } (w-x)(w+x)$$

$$41) \frac{(w+x)(w+x)3}{w-x} - \frac{3(w+x)(w-x)}{w+x} = \frac{3w+3x - 3w+3x}{6} = \frac{6x}{6} = \textcircled{x}$$

$$\frac{6}{w^2-x^2} \frac{(w+x)(w-x)}{(w+x)(w-x)}$$